

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 25-44 and 46-50 are in the case.

I. THE 35 U.S.C. §112, SECOND PARAGRAPH, REJECTION

Claim 25 stands rejected under 35 U.S.C. §112, second paragraph, as allegedly indefinite for lack of antecedent basis in regard to "the production of acetic acid". In addition, the Action asserts that a connector, such as "and," is required before the phrase, "optionally at least one of".

In response, it is believed that the expression "the production of acetic acid" does not require antecedent basis since this phrase simply limits the process of the invention to a process which produces acetic acid. In reference to the assertion that the word "and" should be inserted before "optionally at least one of", it is believed that to insert the word "and" at this point would be grammatically incorrect. Withdrawal of the indefiniteness rejection with respect to claim 25 is requested.

Claims 30, 36, and 41 stand rejected as allegedly indefinite for lack of antecedent basis for the expressions "the molar ratio" and "the range." In response, inherent components of elements of the invention which have already been recited have antecedent basis in the recitation of the components themselves [MPEP 2173.05(e)]. In claim 30, as the oxoacid anion and the iridium inherently have a molar ratio, no explicit antecedent for "the molar ratio" is required. Similarly, in claim 36, the superacid anion and the iridium inherently have a molar ratio, and in claim 41, the heteropolyacid anion and the iridium inherently have a molar ratio. With regard to the term "the range", this

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

term does not require antecedent basis since its presence simply limits the molar ratio to being within a specified range. Withdrawal of this rejection is requested.

Claims 31, 37, 42, 47 and 49 are rejected under 35 U.S.C. 112, second paragraph, as allegedly indefinite in view of the expression "such as". In response, and without conceding to this rejection, the expression "such as" and the language qualified thereby has been removed from the claims.

Claims 39 and 45 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for using "and/or." Applicants respectfully disagree. The term "and/or" means either or both. Thus, in claim 25, "methanol and/or reactive derivative thereof" means methanol, a reactive derivative of methanol or a mixture of methanol and a reactive derivative of methanol. In claim 39, "molybdenum and/or tungsten" means molybdenum, tungsten, or a mixture of molybdenum and tungsten. Withdrawal of this aspect of the rejection is requested.

Claims 46 and 48 are objected to because they recite the limitations "the concentration" and "the range" which allegedly have insufficient antecedent basis. As discussed above, inherent components of elements of the invention which have already been recited have antecedent basis in the recitation of the components themselves. Components of a liquid reaction composition inherently have a concentration in the liquid reaction composition. Thus, the term "the concentration" in claims 46 and 48 has inherent basis in the earlier recitation of presence of the component (claim 46: methyl acetate; claim 48: water) in the liquid reaction composition. With regard to the term "the range", the Applicant submits that this term does not require antecedent basis, since its presence simply limits the concentration to being within a specified range.

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

One of ordinary skill would have no difficulty understanding the scope of all pending claims in this case. Withdrawal of the formal rejection is respectfully requested.

II. THE ANTICIPATION REJECTIONS

Claims 25, 43, 44, 45, 46, 47, 48, 49, 50 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by Baker *et al.* (EP 0752406) (Baker). The rejection is traversed.

The present invention as now claimed is directed to a process for producing acetic acid by reacting carbon monoxide with methanol and/or a reactive derivative thereof in a liquid reaction composition comprising methyl acetate, a finite concentration of water, acetic acid and a catalyst system requiring all of the following:

- an iridium carbonylation catalyst;
- a methyl iodide co-catalyst; and
- a non-hydrohalogenoic acid promoter.

In essence, claim 25 has been amended to be directed to a process for the production of acetic acid, which process employs the catalyst as defined in original claim 25. Basis for this amendment can be found in original claim 45. Claim 45 has accordingly been canceled without prejudice. No new matter is entered.

The claimed process employs a non-hydrohalogenoic acid promoter. The non-hydrohalogenoic acid employed in the claimed process must therefore be capable of promoting the iridium catalyst.

Baker, on the other hand, relates to an iridium catalysed, methyl iodide co-catalysed, methanol carbonylation process for the production of acetic acid. Baker does

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

not disclose the presence of a non-hydrohalogenoic acid **promoter** in the catalyst system, as presently claimed. Rather, Baker discloses H_2IrCl_6 which is an iridium carbonylation **catalyst** (page 4, line 43); this is not a promoter for an iridium catalyst. The propionic acid formed in the reaction composition of Baker is a byproduct (see, for example, D1 abstract; claim 1 part (a) ((vii) and part (f)). Propionic acid does not promote an iridium carbonylation catalyst and is therefore not an iridium catalyst promoter. Likewise, the presence of acetic acid in the reaction compositions of Baker does not promote the iridium catalyst and is therefore not an iridium catalyst promoter. Baker does clearly does not anticipate the presently claimed process.

Claims 25, 26, 27, 28, and 29 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by Bruner, Jr. *et al.* (US 5,710,325) (Bruner). This rejection is traversed.

At the outset, it is noted that claim 45 is not rejected over Bruner. Combination of claims 25 and 45 therefore further distinguishes the claimed invention over Bruner.

Moreover, Bruner discloses a catalyst system comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, and an oxoacid promoter, such as phosphoric acid (column 2, lines 34-36, 42-46 and column 5, lines 26-27, 52). Bruner relates to the preparation of adipic acid from pentenoic acids or esters of pentenoic acids by hydrocarboxylation. Bruner does not disclose a process for the production of acetic acid in which carbon monoxide is reacted with methanol and/or reactive derivative thereof. Clearly, Bruner does not anticipate the presently claimed process.

Withdrawal of the two outstanding anticipation rejections is respectfully requested.

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

III. THE OBVIOUSNESS REJECTIONS

Claims 30 and 31 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Bruner. Claims 32 and 33 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Bruner in view of Wegman *et al.* (US 6,521,783) (Wegman). Claims 25, 26, 32, 33, 36, 37, 38, 39, 40, 41 and 42 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Wegman. Claims 32, 33, 34 and 35 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Bruner in view of Pesa *et al.* (US 4,469,886) (Pesa).

At the outset, it is noted that claim 45 is not rejected on obviousness grounds. The amendment of claim 25 to incorporate the subject matter of claim 45 therefore further distinguishes the claimed invention from the cited art.

The problem addressed by the present invention is to seek an improved rate of carbonylation in an iridium-catalysed, methyl-iodide co-catalysed carbonylation process for the production of acetic acid (specification, page 2, lines 3-5). The present invention solves this problem by using a non-hydrohalogenic acid in the catalyst system of the carbonylation process.

It is known that in the iridium-catalysed carbonylation of methanol, hydroiodic acid is generated. As the concentration of hydroiodic acid is increased, the rate of carbonylation is found to decrease. It is therefore surprising, according to the present invention, that the concentration of protons in the carbonylation system can be increased without having a detrimental effect on the carbonylation rate (specification, page 2, lines 6-13).

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

The present inventors, on the other hand, have demonstrated surprising results using non-hydrohalogenoic acids as iridium catalyst promoters. Attention in this regard is drawn, for example, to the results of Expts. 5 and C. In Experiment C, a ruthenium promoter was used but no non-hydrohalogenoic acid promoter. In Experiment 5, both ruthenium and a non-hydrohalogenoic acid promoter were used. The results of this experiment and other experiments in Tables 1 to 5 of the specification demonstrate surprisingly that improved carbonylation rates are achieved when a non-hydrohalogenoic acid promoter is used compared to the rates obtained by the use of an iridium catalyst in the presence or absence of a conventional metal promoter.

Bruner, as noted above, relates to a process for the preparation of adipic acid by hydrocarboxylation of pentenoic acids or esters of pentenoic acids. This is a different technical field to that of the present invention which relates to the preparation of acetic acid by the carbonylation of methanol. Thus, the person of ordinary skill would have had no motivation to consult Bruner when looking to improve the rate of carbonylation in the carbonylation of methanol. Bruner therefore fails to give rise to a *prima facie* case of obviousness.

Wegman does not cure this deficiency. Wegman relates to processes for the conversion of a feedstock stream comprising carbon monoxide and hydrogen to a product stream comprising at least one of an ester, acid, acid anhydride and mixtures thereof, and to processes for converting an alcohol and/or ether feedstock to oxygenated products, for example acids. The processes are carried out in the absence of halide promoters. Wegman states that the use of halide promoters is undesirable since they are highly corrosive, require the use of exotic metals in the construction of

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

the reaction vessels and require expensive processing equipment to recover the promoter from the product stream (see, col. 1, lines 54-57). In light of this disclosure in Wegman, the person of ordinary skill, upon looking to improve the rate of carbonylation in an iridium-catalysed, methyl iodide co-catalysed carbonylation process for the production of acetic acid would have had no incentive to consult Wegman, since Wegman leads away from the use of methyl iodide. Based on the above, it is clear that Bruner taken alone or in combination with Wegman, or Wegman taken alone do not give rise to a *prima facie* case of obviousness.

Pesa is likewise irrelevant. Pesa relates to a process for the selective hydrocarboxylation of propylene to produce isobutyric acid. This is a different technical field to that of the present invention which relates to the preparation of acetic acid by the carbonylation of methanol. Thus, the person of ordinary skill would have had no motivation to consult Pesa, or Bruner and Pesa together, when looking to improve the rate of carbonylation in the carbonylation of methanol. Absent any such motivation, a *prima facie* case of obviousness has not been generated in this case. Withdrawal of all obviousness rejections is respectfully requested.

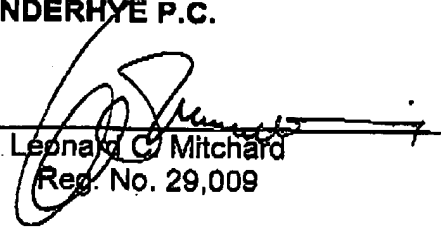
Favorable action is awaited.

HAYNES et al
Appl. No. 10/563,920
October 20, 2008

Respectfully submitted,

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